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| 09/670,820      | 09/28/2000  | Atsushi Shimonaka    | 0717-0446P          | 8768             |

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EXAMINER

LANDAU, MATTHEW C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/670,820

Applicant(s)

SHIMONAKA, ATSUSHI

Examiner

Matthew Landau

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3-14, and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) 5-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 4, 9-14 and 20-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims 5-8 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 11.

### ***Claim Objections***

2. Claim 12 objected to because of the following informalities: the limitation “comprised of substantially non-optically absorptive material” is unclear. It is suggested this limitation be rewritten as follows: “comprised of [substantially non-optically absorptive] low optical absorption material”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 23, and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regards to claim 1, the limitation “identical laser emission portions” renders the claim indefinite. It is unclear what aspects of the laser emission portions are identical. Is this a structural or operational limitation? It is also unclear what is meant by the limitation “equidistantly optically coupled”.

In regards to claim 23, the limitation "equivalent refractive index" renders the claim indefinite. It is unclear to what the refractive index is equivalent.

In regards to claim 28, it is unclear what is meant by the limitation "like laser". How does this further structurally define the claimed invention? Furthermore, there is insufficient antecedent basis in the claim for "the third layer and the output waveguide region".

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 3, 4, 9-12, 21, 23-26, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Kudo.

In regards to claim 1, as best the examiner can ascertain the claimed invention, Figures 10 and 17-19 of Kudo disclose a semiconductor laser element, comprising: a semiconductor laser region (DFB laser region) including a plurality of identical laser emission portions (the two middle portions, i.e., ch's 4 and 5) arranged side by side in a parallel array, each of said laser emission portions including an active layer (MQW layer 14) for emitting light; a multimode interference (MMI) region including a first wave-guiding layer (MQW layer 14), wherein one

end of the first wave-guiding is equidistantly optically coupled to the active layers of the plurality of laser emission portions; and an output waveguide region (optical amplifier/modulator region) including a second wave-guiding layer (MQW 14), the second wave-guiding layer being optically coupled to an opposite end of the first wave-guiding layer of the interference region. Kudo discloses the layered structure of Figure 10 is used in the embodiment shown in Figures 17-19 (see column 15, lines 20-28 and lines 45-62).

In regards to claim 3, Figure 17 of Kudo discloses the semiconductor laser region (DFB laser region), the multimode interference region (MMI region), and the output waveguide region (amplifier/modulator region) are provided on same semiconductor substrate 99.

In regards to claim 4, Figure 19 of Kudo discloses a first electrode 21 provided on a lower surface of the semiconductor substrate, and a second electrode 20 provided at least on, an upper surface of the semiconductor laser region.

In regards to claim 9, Kudo discloses the active layer (MQW 14 of DFB laser region) of the plurality of laser emission portions (ch.'s 4 and 5), the first wave-guiding layer (MQW 14) of the multimode interference region, and the second wave-guiding layer (MQW 14 of optical amplifier/modulator region) of the output waveguide region are integrally formed of the same material (see column 15, lines 20-28).

In regards to claim 10, Figures 10 and 17-19 of Kudo disclose in input waveguide region (optical multiplexer region) located between the semiconductor laser region and the interference region, and including a plurality of mutually spaced apart substantially equal length third wave-guiding layers (MQW 14 of the regions of the optical multiplexer region corresponding to ch.'s 4 and 5) for optically coupling the active layers (MQW 14 of DFB laser region) of the plurality of

laser emission portions and the first wave-guiding layer of the multimode interference region.

In regards to claim 11, Kudo discloses the plurality of active layers (MQW 14 of DFB laser region), the first wave-guiding layer (MQW 14 of MMI region), and the plurality of the third wave-guiding layers (MQW 14 of optical multiplexer region) are integrally formed of the same material (see column 15, lines 20-28).

In regards to claim 12, Kudo discloses the first wave-guiding layer (MQW 14 of the MMI region) and the plurality of third wave-guiding layers (MQW 14 of optical multiplexer region) are comprised of substantially non-optically absorptive material (see column 15, lines 25-27).

In regards to claim 28, as best the examiner can ascertain the claimed invention, Figures 10 and 17-19 of Kudo disclose a semiconductor laser element comprising: a semiconductor laser region (DFB laser region) including a plurality of like laser oscillation portions (the two middle portions, i.e., ch's 4 and 5) arranged side by side, and having a common electrode 21, each of said laser oscillation portions having an active layer (MQW layer 14); a multimode interference (MMI) region including a first wave-guiding layer (MQW layer 14) coupled to said laser oscillation portions via an input waveguide region (optical multiplexer region) including a plurality of parallel equal length waveguides (middle two waveguides, corresponding to ch's 4 and 5) having respective second wave-guiding layers (MQW layer 14). Note that the middle two waveguides are parallel at the point closest to the laser region. Figures 10 and 17-19 of Kudo further disclose the active layer of the plurality of laser oscillation portions, the first wave-guiding layer of said multimode interference region, the second layers of the input waveguide region, and the third layer of the output waveguide region (optical amplifier/modulator region) are formed on a common substrate. Note the intended use limitations "for operating in a single

mode” and “which performs laser operations at a same wavelength” do not structurally distinguish the claimed invention over the prior art.

In regards to claim 21, Kudo discloses the first wave-guiding layer (MQW 14 of MMI region) and the plurality of second wave-guiding layers (MQW 14 of optical multiplexer region) are comprised of the same material having a low light absorption (see column 15, lines 25-27).

In regards to claim 23, it is inherent for a waveguide layer to have a refractive index. As best the examiner can ascertain the claimed invention, Kudo discloses each of the plurality of second wave-guiding layers (MQW 14) of the input waveguide region (optical multiplexer region) has a predetermined equivalent refractive index. Each of these layers are formed of the same material under the same conditions (see column 15, lines 20-28), therefore it is inherent that they have the same refractive index.

In regards to claim 24, Kudo discloses each of the plurality of second wave-guiding layers (MQW 14 of optical multiplexer region) have a width (see column 15, lines 6-12).

In regards to claims 25, Kudo discloses each of the plurality of second wave-guiding layers (MQW 14 of optical multiplexer region) have a width (see column 15, lines 6-12). The width of an end product cannot be compared to an imaginary, intended value. Thus, the manufacturing accuracy with respect to the predetermined width does not patentably distinguish the claimed invention over the prior art.

In regards to claim 26, the product by process limitation “wherein the geometric pattern of the plurality of second wave-guiding layers is made by a reduction exposure method” does not patentably distinguish the claimed invention over the prior art.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 13 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kudo in view of Towe et al.

In regards to claim 13, the difference between Kudo and the claimed invention is the first wave-guiding layer and the plurality of third wave-guiding layers formed of AlGaAs. Figure 3a of Towe et al. discloses wave-guiding layers 16' formed of AlGaAs. In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Kudo by forming the first wave-guiding layer and the plurality of third wave-guiding layers from AlGaAs. The ordinary artisan would have been motivated to modify Kudo in the manner described above for the at least the purpose of selecting a semiconductor material with similar properties.

In regards to claim 22, the difference between Kudo and the claimed invention is the first wave-guiding layer and the plurality of second wave-guiding layers are made of AlGaAs. Figure 3a of Towe et al. discloses wave-guiding layers 16' formed of AlGaAs. In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Kudo by making the first wave-guiding layer and the plurality of second wave-guiding layers from AlGaAs. The ordinary artisan would have been motivated to



modify Kudo in the manner described above for the at least the purpose of selecting a semiconductor material with similar properties.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kudo in view of McFarlane et al.

The difference between Kudo and the claimed invention is a dielectric film provided between the plurality of active layers and the plurality of second wave-guiding layers. Figure 3c of McFarlane et al. discloses a dielectric film 14 disposed between a laser active region 18 and a waveguide active region 8. In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Kudo by including a dielectric film between the plurality of active layers and the plurality of second wave-guiding layers. The ordinary artisan would have been motivated to modify Kudo in the manner described above for the purpose of providing a reflective surface.

10. Claims 14 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kudo in view of Mazed.

In regards claim 14, the difference between Kudo and the claimed invention is an electronic device that supplies a modulation signal to the semiconductor laser element. Mazed discloses a laser chip 10 with a modulation signal applied thereto (see column 16, lines 61-65). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Kudo by incorporating an electronic device that supplies a modulation signal to the semiconductor laser element. The ordinary artisan would

have been motivated to modify Kudo in the manner described above for the purpose of adjusting the laser output.

In regards to claim 27, the difference between Kudo and the claimed invention is an electronic device that outputs a modulation signal to the semiconductor laser element. Mazed discloses a laser chip 10 with a modulation signal applied thereto (see column 16, lines 61-65). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Kudo by incorporating an electronic device that outputs a modulation signal to the semiconductor laser element. The ordinary artisan would have been motivated to modify Kudo in the manner described above for the purpose of adjusting the laser output.

### ***Response to Arguments***

11. Applicant's arguments filed January 29, 2003 have been fully considered but they are not persuasive.

In response to Applicant's argument that "the wavelength of each laser portion of Kudo can be or is varied slightly with each other and thus it is virtually impossible to generate the same wavelength for all of the laser portions...", a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art.

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See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

In response to Applicant's arguments on page 8, lines 1-9, have been considered but are moot in view of the new grounds of rejection.

### ***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (703) 305-4396.

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The examiner can normally be reached from 8:00 AM-4:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Matthew C. Landau

Examiner

April 2, 2003

A handwritten signature in black ink, appearing to read 'Eddie Lee', with a large, sweeping initial 'E'.

EDDIE LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800